

## **Appendix P**

Watercraft Related Mortality Statistics by Stock (1974 - 2002).

Table 1. Annual Watercraft Mortality from 1974-2002 by County/Stock.

County/Stock	Year																							Total						
	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	
<b>Atlantic Stock</b>																														
Brevard	0	1	1	3	4	10	7	5	2	1	4	8	4	6	8	10	7	13	7	9	9	6	13	12	9	12	13	7	17	208
Volusia-A	0	0	1	0	1	0	0	0	2	0	1	1	2	2	0	1	3	1	1	0	1	0	2	1	5	4	3	7	2	41
Dade	2	1	2	1	2	1	0	1	0	1	1	4	1	3	1	0	4	0	1	2	0	5	2	1	2	5	1	43		
Broward	0	1	1	0	0	0	2	1	2	1	2	0	2	5	2	3	1	2	2	2	3	0	1	0	2	5	2	4	3	49
Duval	0	0	2	1	5	6	0	1	1	2	7	4	2	5	4	6	3	9	2	2	3	3	2	3	2	4	1	10	92	
Palm Beach	0	0	1	4	1	1	0	1	0	2	2	3	1	1	2	0	3	1	0	3	2	2	3	1	2	2	3	3	6	50
Indian River	0	0	0	0	0	0	2	1	0	2	1	1	0	0	2	0	1	0	0	0	1	4	1	3	1	4	1	2	27	
Monroe	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	1	0	0	2	1	0	3	1	0	1	3	3	2	5	26
Martin	0	0	0	0	1	3	0	1	1	0	1	2	3	2	4	2	4	2	1	0	1	1	2	3	1	2	1	1	2	41
Clay	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	0	0	0	2	0	0	1	0	11	
St. Johns	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	3	10	
St. Lucie	0	0	0	0	0	0	0	1	0	0	2	1	0	1	0	1	4	1	1	1	0	0	0	1	0	0	1	1	1	17
Nassau	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	4	
Flagler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	1	6	
Total	2	3	8	10	15	21	9	14	12	7	22	22	16	26	24	29	27	31	24	19	21	20	31	25	32	34	37	33	53	625
<b>Northwest Stock</b>																														
Citrus	1	0	0	0	1	0	0	0	0	2	1	2	0	2	2	1	0	3	1	2	0	2	1	2	4	1	1	3	32	
Dixie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	2	0	0	4	
Hernando	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	
Levy	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	6	
Taylor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	
Wakulla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Total	1	3	0	0	1	0	0	0	0	0	2	1	2	0	2	2	2	1	3	1	2	0	3	2	5	4	5	1	4	47
<b>Southwest Stock</b>																														
Lee	0	0	1	2	2	0	2	4	3	1	1	5	3	3	8	0	5	7	2	5	10	8	14	9	9	10	13	23	13	163
Collier	0	0	0	0	0	1	1	4	3	4	0	1	9	6	4	7	7	5	4	5	4	4	5	4	7	10	5	8	6	114
Charlotte	0	0	1	0	0	0	0	0	1	2	0	1	1	0	2	1	2	0	1	2	4	1	4	3	5	5	2	4	42	
Hillsborough	0	0	0	0	2	0	0	0	1	0	1	3	0	0	0	0	2	2	0	2	3	4	3	1	4	2	4	5	39	
Sarasota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	0	2	2	0	1	2	0	4	5	2	4	
Glades	0	0	0	0	1	1	1	1	0	2	3	1	0	0	1	2	1	0	0	0	2	0	0	2	1	4	3	0	1	27
Manatee	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	2	1	0	0	3	3	0	1	2	17	
Pinellas	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	3	0	0	1	0	1	1	0	1	2	2	0	1	2	16
Pasco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	
Hendry	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	3	
Total	0	0	2	2	5	2	5	9	7	8	8	10	15	12	16	16	17	18	10	14	25	21	25	26	26	43	34	42	37	455
<b>Upper St. Johns Stock</b>																														
Volusia-R	0	0	0	1	0	1	1	0	0	0	1	0	0	1	2	0	0	0	1	0	0	3	1	1	3	1	18			
Lake	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	2	1	0	7		
Putnam	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	0	0	1	1	1	0	1	1	0	0	0	0	0	10	
Seminole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
Total	0	0	0	1	0	1	2	1	1	0	2	0	0	1	1	3	1	3	1	1	1	1	1	3	1	3	5	1	36	
Total	3	6	10	13	21	24	16	24	20	15	34	33	33	39	43	50	47	53	38	35	49	42	60	54	66	82	79	81	95	1163

Table 2. Five Year Averages of Watercraft Mortality.

County/Stock	Five-Year Average Groups				
	97-01	92-96	87-91	82-86	74-81
<b>Atlantic Stock</b>					
Brevard	10.6	8.8	8.8	3.8	3.9
Volusia-A	4.0	0.8	1.4	1.2	0.3
Dade	3.0	1.4	1.8	0.6	1.3
Broward	2.6	1.6	2.6	1.4	0.6
Duval	2.4	2.4	5.4	3.2	1.9
Palm Beach	2.2	2.0	1.4	1.6	1.0
Indian River	2.0	1.0	0.6	1.0	0.3
Monroe	1.8	1.4	0.6	0.4	0.0
Martin	1.6	1.0	2.8	1.4	0.6
Clay	0.6	1.0	0.2	0.0	0.3
St. Johns	0.6	0.2	0.0	0.4	0.1
St. Lucie	0.4	0.6	1.4	0.6	0.1
Nassau	0.2	0.2	0.2	0.2	0.0
Flagler	0.2	0.6	0.2	0.0	0.0
Total	32.2	23.0	27.4	15.8	10.3
<b>Northwest Stock</b>					
Citrus	1.8	1.6	1.0	1.0	0.3
Dixie	0.6	0.0	0.2	0.0	0.0
Hernando	0.4	0.0	0.0	0.0	0.0
Levy	0.2	0.2	0.2	0.0	0.4
Taylor	0.2	0.0	0.0	0.0	0.0
Wakulla	0.2	0.0	0.0	0.0	0.0
Total	3.4	1.8	1.4	1.0	0.6
<b>Southwest Stock</b>					
Lee	12.8	7.8	4.6	2.6	1.4
Collier	6.8	4.4	5.8	3.4	0.8
Charlotte	3.8	1.6	1.2	0.8	0.1
Hillsborough	2.8	2.2	0.4	1.0	0.3
Sarasota	2.6	1.0	1.8	0.0	0.0
Glades	2.0	0.4	0.8	1.2	0.5
Manatee	1.4	0.8	0.6	0.2	0.0
Pinellas	1.2	0.6	0.6	0.2	0.1
Pasco	0.6	0.0	0.0	0.0	0.0
Hendry	0.2	0.2	0.0	0.2	0.0
Total	34.2	19.0	15.8	9.6	3.1
<b>Upper St. Johns Stock</b>					
Volusia-R	1.6	0.2	0.8	0.2	0.4
Lake	0.6	0.0	0.6	0.2	0.0
Putnam	0.2	0.8	0.4	0.2	0.3
Seminole	0.2	0.0	0.0	0.0	0.0
Total	2.6	1.0	1.8	0.6	0.6
Total	72.4	44.8	46.4	27.0	14.6

**Table 3.** Florida manatee population status summaries by region. Data from the Northwest, Upper St. Johns River and Atlantic Regions were based upon survival rates from Langtimm et al. (1998) and population growth estimates from Eberhardt and O'Shea

		Northwest Primarily NW peninsular FL	Southwest Tampa Bay to Whitewater Bay	Upper St. Johns Upstream, South of Palatka	Atlantic GA - Miami & lower St. Johns
Photo-identification-based estimates	Adult Survival (% per year)	96.5 (95.1-97.5)	Survival, reproductive and population growth rate estimates based on resightings of known individuals are not currently available.	96.1 (90.0-98.5)	90.7 (88.7-92.6)
	Population Growth Rate (% per year)	7.4		5.7 (3-8)	1.0
	Reproduction:				
	Percent adult females with calf	43% ± 9%		41%	42%
	Percent adult females with 1 <sup>st</sup> year calf	36% ± 6%		30%	39%
	Mean interbirth interval	2.5 ± 0.77		2.6 ± 0.81 winter seasons	2.6 ± 0.64 winter seasons
	Mean calf dependency period	1.2 ± 0.42		1.3 ± 0.48 winter seasons	1.2 ± 0.42 winter seasons
	Mean age females at first reproduction	5.1 ± 1.21 years		5.4 ± 0.98 years	---
Causes of death based on carcass recovery	1980 - 1999 Overview	<ul style="list-style-type: none"> <li>Total of 153 carcasses</li> <li>All causes, increasing 5.5% per year</li> <li>Watercraft-related, increasing 10.8% per year</li> </ul>	<ul style="list-style-type: none"> <li>Total of 1,358 carcasses</li> <li>All causes increasing 4.8% per year</li> <li>Watercraft-related, increasing 7.1% per year</li> </ul>	<ul style="list-style-type: none"> <li>Total of 79 carcasses</li> <li>All causes, increasing 2.6% per year</li> <li>Watercraft-related, increasing 1.6% per year</li> </ul>	<ul style="list-style-type: none"> <li>Total of 1,659 carcasses</li> <li>All causes, increasing 6.9% per year</li> <li>Watercraft-related, increasing 5.5% per year</li> </ul>
	1989 - 1999 More recent trends	<ul style="list-style-type: none"> <li>Average of 8.9 per year (range = 6-12)</li> <li>Human related cause of death 30% (adults 40%)</li> </ul>	<ul style="list-style-type: none"> <li>Average of 85.5 per year (range = 57-134)</li> <li>281 in 1996 (including 145 red tide related deaths)</li> <li>Human related cause of death 30% (adults 48%)</li> </ul>	<ul style="list-style-type: none"> <li>Average of 4.5 per year (range = 2-7)</li> <li>Human related cause of death 43% (adults 62%)</li> </ul>	<ul style="list-style-type: none"> <li>Average of 107 per year (range = 70-135)</li> <li>206 in 1990 (46 cold-related)</li> <li>Human related cause of death 34% (adults 57%)</li> </ul>
	Habitat Related Concerns	<ul style="list-style-type: none"> <li>Spring flow rates</li> <li>Water quality and SAV</li> <li>Storm-related salinity fluctuations, resulting in vegetation declines</li> <li>Storm-related impacts on adult survival</li> <li>Human disturbance at warm-water springs</li> <li>Potential conflict between weed control and manatee food supply</li> <li>Papilloma virus implications unknown</li> </ul>	<ul style="list-style-type: none"> <li>Manatee dependence on power plants as thermal refuges</li> <li>Increasing boat traffic</li> <li>Periodic red tide-related deaths</li> <li>Moderate level of water control structure deaths</li> <li>Water quality and SAV</li> <li>Salinity fluctuations, resulting in vegetation declines</li> <li>Storm-related impacts on adult survival</li> <li>Human disturbance</li> </ul>		<ul style="list-style-type: none"> <li>Manatee dependence on power plants as thermal refuges</li> <li>Increasing boat traffic</li> <li>ICW shared manatee-human travel corridor</li> <li>High level of water control structure deaths, especially in SE</li> <li>Water quality and SAV</li> <li>Salinity fluctuations, resulting in vegetation declines</li> <li>Storm-related impacts on adult survival</li> <li>Human disturbance</li> </ul>
	Current Status	<ul style="list-style-type: none"> <li>Exceeds survival, reproduction, and population growth criteria</li> <li>Although overall deaths are relatively low, watercraft-related deaths are increasing rapidly</li> </ul>	<ul style="list-style-type: none"> <li>Estimates of survival and population growth not yet available; reproduction criterion has been exceeded for group that summers in Sarasota Bay</li> <li>Overall deaths are high, watercraft-related deaths are increasing rapidly</li> </ul>	<ul style="list-style-type: none"> <li>Meets or exceeds survival, reproduction, and population growth criteria</li> <li>Overall deaths are moderate, watercraft-related deaths increasing slowly</li> </ul>	<ul style="list-style-type: none"> <li>Meets reproduction criterion; may meet survival and population growth criteria</li> <li>Overall deaths are high, watercraft-related deaths increasing moderately</li> </ul>